# Mars, Mars Pro

## 900, 1200, 1500, 1800

***Class 2- Biohazard Safety Cabinet***
***with automatic control system***
***MICROPROCESSOR BASED***

# USER MANUAL

CE

TÜV NORD GS geprüfte Sicherheit

## Symbols used in this Manual

NOTE

Used to direct attention to a special item.

WARNING

Used in case of danger of a serious accident.

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Declaration of Conformity

# 1 Introduction

You are now in possession of a high quality microprocessor-controlled Class II cabinet, Mars-Mars Pro, designed to provide protection of the operator, the environment, and the processed product against particle-/microbiological contamination.
The cabinet complies with the requirements stipulated in EN 12469.
The ScanLaf Mars/Mars Pro Class II cabinets have:

Microprocessor controller with:

- LCD display indicating fan and alarm status.
- Air velocity sensors.
- Clock (7 days) and hour-counter.
- Pre-setting of automatic start-up and UV timer.
- Alarm for any deviation from safety conditions.

Ergonomically correct sloping front for maximum operator comfort.
Motor-driven front window, with both sliding and hinged modes.
Side windows, for perfect light conditions and view to the surroundings.
Negative pressure plenum for highest operator and product safety.
Adjustable FAN speeds.
Opportunity to select FAN off, reduced, or normal air velocity
Down flow laminar flow better than ± 10%
Noise level less than 54 dBA
Light level up to 2000 Lux

# 2 Safety Precautions

- To avoid unintended or improper operation of the cabinet, please carefully read this manual.
- Also, please pay attention to the short form operating instructions on the label stuck on the cabinet.
- If you have questions related to the function or control of the cabinet or wish to order spare parts, please always indicate the nameplate data.

The proper function and safety of the cabinet are only secured if personnel authorized by us to do so perform the required tests, maintenance and repair work.

Please also refer to sections “Testing” and “Maintenance”.
The following precautions must be taken for operation of the ScanLaf Mars-Mars Pro-series.

The safety cabinet must not be used for Group 4 pathogens.

Attention is drawn to the risk assessment requirements of the Control of Substances Hazardous to Health (COSHH) Regulations 1999. (UK)

The cabinet is not suitable for HIGH-RISK biological agents.
HIGH RISK biological agents include all etiologic agents designated Class 4 by CDC, and oncogenic viruses classed high risk by NCI. (USA)

Never operate the ScanLaf Mars-Mars Pro cabinets if the fan compartment cover is removed.

If this cover is removed, the cabinet will give no protection of the operator or the environment and the fan will run with openly rotating blades.

The ScanLaf Mars-Mars Class II cabinets will not provide any protection for operator or environment against harmful gases or vapours.

Always keep your hands out of the work chamber before activating the sliding window.
The airspeed monitoring system needs approximately 5 minutes to warm up and stabilise after the fan has been switched on.

# 3 Description

**Working principle**

The microbiological safety cabinet is a modified exhaust cabinet with a turbulence-free (laminar) vertical displacement flow of clean air in the work chamber protecting the product against particle contamination. During operation the front window is partly open and the in-going airflow prevents the escape of particles from the inside of the work chamber thus protecting the operator and the environment.

**Air filtration**

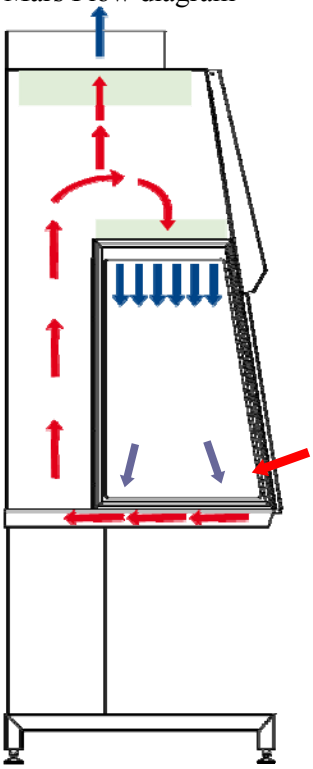
The ScanLaf Mars-Mars Pro main filter and exhaust filter of ScanLaf Mars-Mars Pro and the prefilter for Mars Pro are all high-efficiency HEPA filters.

**Air velocity monitoring**

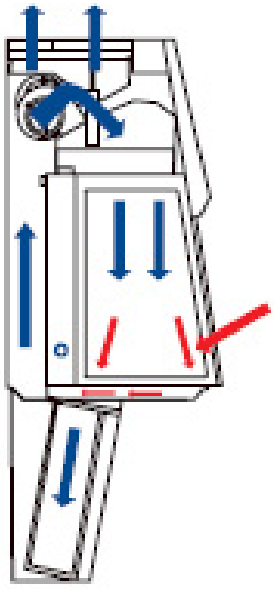
The low turbulence vertical flow and the exhaust flow are monitored by means of air velocity sensors. Any deviation from safe conditions will be indicated optically and acoustically.

**Airflow diagram**

Mars Flow diagram



Mars Pro Flow diagram



**Design:**

The safety cabinet consists of

- Fan and filter compartment and return air duct (double back wall) made of polyester-coated sheet steel.
- Support stand made of polyester-coated sheet steel and equipped with leveling feet.
- Work chamber with tabletop and trough in stainless steel (AISI 304).
- Side windows and sliding front window all in safety glass.
- Internal ventilation system with negative pressure plenum.
- Microprocessor control and supervision system.
- Mars Pro prefilter cabinet is made in polyester-coated sheet steel
- Mars Pro prefilter holder are made in stainless steel (AISI 304)

The work chamber is formed by the ceiling (main HEPA filter and air distributor), side windows, side panels with installation zones, back wall, tabletop and trough; the front is partly closed by the sliding front window; the work opening is situated below the front window.

- The air distributor after the main HEPA filter covers the entire ceiling surface thus giving an extremely uniform airflow.
- The trough will collect and hold any spillage of fluids. A drain valve can be installed.
- Mars Pro has installed drain channels between the tabletops to avoid spills into the prefilters
- The installation zones in the back wall can be equipped with electric outlets.
- The side windows come with holes for installation of valves.
- The stainless steel modular tabletop is easily removed for cleaning.
- The internal light is installed between the air distributor and the main filter. This secures that the light is glare-free and the airflow is turbulence free.

Options:

- UV light mounted on the front wall above the front window.
- Protective ground sockets 230V ~ / 4A installed in the side panels.
- Valves for various gasses i.e. gas, nitrogen ($N_2$) vacuum, or Carbon dioxide ($CO_2$), a maximum of 3 installed in each side window.
- Exhaust valve for connection to the exhaust system  consult your dealer for detailed information.
- Double HEPA-filter exhaust system as specified by BS 5726-(92).
- Carbon filter exhaust system takes organic solvents when doing recirculation

Please contact our sales department for information regarding other available options.

# 4 EN 12469 Approvals

The ScanLaf Mars GS is approved with the following options:

- Max. 2 pcs Electrical outlets in each side panel (left and right)
- Max 3 pcs gas valves in each side window
- UV-light
- Marble stone built-in the table top for supporting a balance.

# 5 Technical Specifications

| **Model Mars** | **Unit** | **M-900** | **M-1200** | **M-1500** | **M-1800** |
|---|---|---|---|---|---|
| Catalogue No. | | 9.001.023.000 | 9.001.020.000 | 9.001.022.000 | 9.001.021.000 |
| External dimension (DxWxH) | mm | 798x1003x1248 | 798x1303x1248 | 798x1603x1248 | 798x1903x1248 |
| Working chamber dimensions (DxWxH) | mm | 650x900x720 | 650x1200x720 | 650x1500x720 | 650x1800x720 |
| Front opening, fixed | mm | 200 | 200 | 200 | 200 |
| Working, height | mm | 750 - 1050 | 750 1050 | 750 - 1050 | 750 – 1050 |
| Air velocity, vertical flow | m/s | 0,35 | 0,35 | 0,35 | 0,35 |
| Air velocity, deviation | ±% | 10 | 10 | 10 | 10 |
| Down Flow rate | $m^3/h$ | 800 | 1100 | 1300 | 1500 |
| Noise level, ISO6081 | dB(A) | <54 | <54 | <55 | <55 |
| Light intensity variable | Lux | 0-2000 | 0-2000 | 0-2000 | 0-2000 |
| HEPA filters | | H-14 | H-14 | H-14 | H-14 |
| Voltage/frequency | V/Hz | 220/50 or 115/60 | 220/50 or 115/60 | 220/50 or 115/60 | 220/50 or 115/60 |
| Power | W | 600 | 600 | 700 | 800 |
| Fuses | A | 10 | 108 | 10 | 10 |
| Net weight | kg | 225 | 250 | 275 | 300 |
| Shipping volume | $m^3$ | 2,2 | 2,9 | 3,5 | 4,1 |
| Window material | | hardened/laminated glass | hardened/laminated glass | hardened/laminated glass | hardened/laminated glass |
| Cabinet material | | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel |

| Model Mars PRO | Unit | Mars PRO-900 | Mars PRO-1200 | Mars PRO-1500 | Mars PRO-1800 |
|---|---|---|---|---|---|
| Catalogue No. | | 9.002.023.000 | 9.002.020.000 | 9.002.022.000 | 9.002.021.000 |
| External dimension (DxWxH) | mm | 798x1003x1998 | 798x1303x1998 | 798x1603x1998 | 798x1903x1998 |
| Working chamber dimensions (DxWxH) | mm | 650x900x720 | 650x1200x720 | 650x1500x720 | 650x1800x720 |
| Front opening, fixed | mm | 200 | 200 | 200 | 200 |
| Working, height | mm | 750 – 1050 | 750 – 1050 | 750 – 1050 | 750 – 1050 |
| Air velocity, vertical flow | m/s | 0,35 | 0,35 | 0,35 | 0,35 |
| Air velocity, deviation | ±% | 10 | 10 | 10 | 10 |
| Down Flow rate | $m^3/h$ | 800 | 1100 | 1300 | 1500 |
| Exhaust Flow rate | $m^3/h$ | 300 | 400 | 500 | 600 |
| Noise level, ISO6081 | dB(A) | <55 | <55 | <56 | <5 |
| Light intensity variable | Lux | 0-2000 | 0-2000 | 0-2000 | 0-2000 |
| HEPA filters | | H-14 | H-14 | H-14 | H-14 |
| Voltage/frequency | V/Hz | 220/50 or 115/60 | 220/50 or 115/60 | 220/50 or 115/60 | 220/50 or 115/60 |
| Power | W | 600 | 600 | 700 | 800 |
| Fuses | A | 10 | 108 | 10 | 10 |
| Net weight | kg | 250 | 275 | 300 | 325 |
| Shipping volume | $m^3$ | 2,2 | 2,9 | 3,5 | 4,1 |
| Window material | | hardened/laminated glass | hardened/laminated glass | hardened/laminated glass | hardened/laminated glass |
| Cabinet material | | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel | Polyestercoated /AISI 304 stainless steel |

## 5.1 ..Property of materials

| Units | Material | Treatment |
|---|---|---|
| Support stand | Steel 1203 2 mm | Polyester-coated RAL 9016MAT |
| Front shield | Al Mg 3,2 mm | Polyester-coated RAL 9016MAT |
| All other painted parts | Steel 1203, 1,5 mm | Polyester-coated RAL 9016MAT |
| Trough and tabletop | Stainless steel AISI 304 | Polished |
| Internal main and exhaust plenum | Galvanized steel | |
| Damping plate | MPM<br>Sandwich: Galvanized - Viscoelastcal-Galvanized | |
| Front / Side Windows | Laminated / tempered | 2×3 mm / 1×5 mm |

# 6 Installation

Transport of the ScanLaf Mars Mars Pro can be carried out by lifting the cabinet using a forklift either sideways under the support stand or directly under the trough. Furthermore the cabinet can be moved manually by using hooks in the dedicated holes in the support stand.

Whenever transportation of the cabinet is needed, precautions should be taken to prevent it from overturning due to the high-located mass centre.

In order to prevent damage to the cabinet it must be handled as fragile goods.

Storage of the cabinet must be in an environment of maximum 80 % relative humidity and at temperatures between 5 $^{o}$C to 50 $^{o}$C.

## 6.1 Transport

The cabinet can be moved through a standard 800-mm wide door.

## 6 2 Preparation

The installations site for the unit must be draught-free and should be selected so that frequent passing of people in front of the work opening is avoided.

1. The tabletops of stainless steel are mounted over the trough.
2. Adjust the levelling screws to assure that the tabletop is in horizontal position and levelled.
3. Valves for gases or vacuum are installed in the side windows. A qualified technician must make the connections for the supply.
4. For connection of the exhaust air to the exhaust air systems, special precautions which must be discussed with the cabinet supplier, must be taken.

When the cabinet has been installed

1. Check that the front window is in the correct position, i.e. parallel to the front shield.
2. Never lift the front window manually; , this will cause window to mall function.
3. Check that the window slides from top to bottom without any irregular sound.
4. If the window does not move when the UP or DOWN button is pressed, authorized service personnel must be called to correct the fault.
5. Always keep hands and arms away from the working chamber when activating the front window.

## 6.3 Connections

Required fusing: Circuit breaker 10 A or fuse T 10 A.
In addition, the applicable safety requirements of the local power Supply Company shall apply.

If an automatic relay for disconnection of power in case of electric fault is needed, it must be installed in the supply, as it is not built-in.

Before connecting the power supply it must be checked that the mains specifications correspond to those stated on the type plate.

The safety cabinet is provided with a flexible power cord. The connection may be installed hard-wired or by means of a wall outlet with protective ground.

If a hard-wired connection is used, a main switch, which will cut off all poles to the unit, must be used. This switch must be lockable both in the ON and OFF positions.
If the unit is connected through a protective-ground wall outlet, the connector has the all-pole insulator function. The wall outlet is to be installed out of reach of operators and may only be accessible to authorized personnel.

# 7 Testing

After installation or change of location and before the initial start-up

According to the standard EN 12469, the following must be tested:

- Check that manufacturer s specifications are met
- Leakage test of the main and exhaust air filter.
- Air inlet speed in the work opening.
- Check air flow patterns.
- Optionally a KI-Discus test for testing operator protection in situ.

All tests have to be done by authorized test technician approved by ScanLaf.
The test results must be entered in a test book.

## 7.1 Air velocity in laminar flow

**Equipment:**

The down flow is measured with a calibrated thermo-anemometer.

**Procedure:**

Turn on the cabinet and wait until the airflow has been stabilized.
The thermo-anemometer is placed in the measuring spot in a height 75 mm (50-100) over the upper edge of the front opening.
The measuring spots on the tabletop are for Mars-Mars Pro: Min 4 in a line evenly divided 125 mm from the back wall and 4 in another line 200 mm from the front window.

Each point is to be measured in at least 1 min and the value is to be recorded.
Calculate the mean value; record it as well as the maximum and minimum airflow.

**Acceptance:**

Mean downflow. 0.30 ±10 % m/sec.
Distribution: All velocities between mean ±10 % m/sec.
The fan speed settings are to be recorded.

**Alarms:**

The alarms for high and low downflow are set to mean 20% m/sec, and the matching alarm level settings are to be recorded.

## 7.2 Air velocity in inlet and exhaust opening

**Equipment:**
The inflow is measured with a suitable volumetric measuring device.

**Procedure:**
The measuring can take place directly in the opening or directly at the exhaust filter.

Cover the front opening with a plate and seal it so only an opening for the measuring device, i.e. Balometer, is free.
Measure the volumetric flow and calculate it into velocity in m/s, and record the result.
Formula for the calculation: X $m^3/h$ / (3600s/h x aperture in $m^2$) = Y m/s.

**Acceptance:**
Air velocity in inlet = 0,45 ±10% m/s, = 390 $m^3/h$
The fan speed settings are to be recorded.

**Alarms:**
The alarm for inflow velocity is set to 0,4 m/sec = 345 $m^3/h$, and the matching alarm level setting is recorded.

## 7.3 Airflow patterns, visualization

The purpose of the test is to verify that no smoke escapes from the working space to the room, and that smoke will be drawn into the working space from the room.

**Equipment:**
Smoke stick, i.e. Dräger, Air Current Tube

**Procedure:**
Move the smoke stick in an steady movement along the front opening outside the cabinet. The smoke must be drawn into the cabinet without visible turbulence.
Test the laminarity of the downflow and along the side- and back wall. No smoke must come out in the room and only small turbulence must be observed.

## 7.4 Test of filters

**Equipment:**

Aerosol generator capable of producing test aerosol for HEPA filter leak testing.

Aerosol photometer with an upper measuring threshold of 10 µg/l to 100 µg/l and a range covering not less than 5 log rates.

Test aerosol: PAO-4 from ATI, or
Emmery 3004 from Henkel Company, or an equivalent material.

**Procedure:**

Pre, main- and exhaust filter:

Turn on the Mars-Mars Pro and introduce the aerosol directly under the table top at the center of the cabinet.

Adjust the Photometer to 100% up-stream concentration

Scan the downstream side of the filter over the entire surface. Scan all filter joints and sealant for leaks.

**Acceptance:**

Maximum local penetration: 0.01% of upstream concentration.

## 7.5 Test of the retention at front opening

**General:**

This test is optional, but useful for determination of the operator protection after installation where the cabinet is under influence of the laboratory environment.

**Equipment:**

KI Discus tester, equipment with an aerosol that challenges the air curtain, established by the down- and inflow.

**Procedure:**

With a spinning disc the test aerosol (Potassium iodide 1.5% in Ethanol) is spread inside the Mars-Mars Pro, in a homogeneous aerosol cloud. The particles leave the disc in a horizontal course, and try to pass the air curtain.

Four Air Samplers each with a filter membrane , catch particles which escapes through the air curtain. With a developing agent (Palladium chloride 0.1%) particles deposited on the filter membrane will show up as brown spots. The amount of spots is to be counted.

**Acceptance:**

$A_{pf} = 1 \times 10^5$ – Refer to EN 12469 for details.

# 8 Work Rules

## 8.1 Before start-up

- The cabinets may only be operated at temperatures between 15 $^0$C and 35 $^0$C, at maximum 80% relative humidity, and at normal air pressure.
- All cabinets are developed and produced for use in clean environments.
- They must not be operated outdoors or in environments with extreme air pollution. The safety cabinets are not intended to filter vapours containing acids or organic solvents. The safety cabinets must not be used as a fume hood.
- Approximately 15 minutes before any work in the cabinet, the fan of the unit must be switched on at normal velocity.
  The work chamber and the front- and side windows are to be carefully cleaned and disinfected. Use an ethanol solution or similar. It is recommended to use special lint-free material. Do not use explosive disinfectants. See also section 10.
- Objects and appliances must be carefully cleaned or disinfected before being introduced into the work chamber. Do not bring in writing utensils, packing material, etc.
- The front window is positioned in working position and kept in that position during the entire work process.
- Necessary appliances for use during work must be placed within easy reach.
- Secure the appropriate protection of the operator as well as the product (e.g. clothes, gloves, etc.).

## 8.2 While working

Important for work with environmentally harmful substances!

- Do not perform work while the fan is running at reduced speed.
- The front window must be in work position.
- Place the product behind the perforated area of the work surface.
- Work with calm, smooth movements.
- Never overload the work chamber.
- Reduce the number of transfers into and out of the work chamber.
- Avoid equipment with high heat emission.
- Avoid a cabinet location where personnel frequently pass avoid draughts.

The efficiency of the laminar airflow in the work chamber is essential for personnel and product protection. Negative influences of the flow conditions must therefore be avoided. They are primarily raised due to:

- Rapid movements of the operator s hand, arm, or body both in and in front of the work chamber.
- Covered perforations in the tabletop, both at the front and the back of the work chamber.
- Large objects and apparatus.
- Devices making rapid movements, e.g. agitators, centrifuges.

Do not damage the air distributor, the pre filter (Mars Pro) or the main filter in the ceiling of the work chamber by mechanical objects or heat sources, otherwise the microbiological safety is no longer ensured.

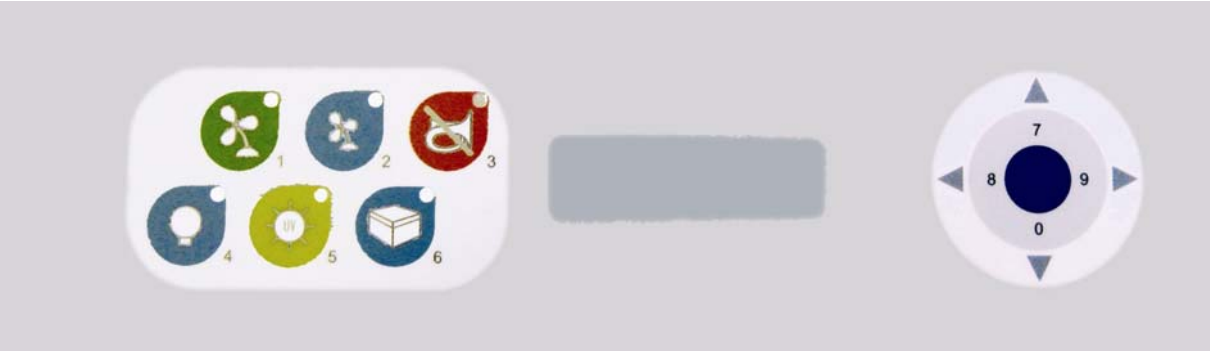
The acoustic and optical monitoring devices of the fan and front window must not be deactivated.
Devices developing strong heat, e.g., burners which can disrupt airflows. If burners cannot be avoided, use safety burners.
Operate heat sources only with the cabinet fan activated.

## 8.3 After work

Remove objects and appliances from the work chamber.
Clean the work chamber, remove fluids, if any, from the trough and dry it. Disinfect if required.
Leave the cabinet fan in operation for about another 10 minutes.
Close the front window to its lowest position.

# 9 Control Panel

All functions are controlled by an electronic card with microprocessor




**Control panel.**

For prevention of any unauthorized switching ON or OFF of the fan, the buttons for normal and reduced velocity must be activated for at least 15 sec.
The display shows, the time and day and any alarm situation. In right side of the display, you have the circle navigation system. The black button in the centre is the “ENTER” button.

1. Button with green LED light to select the fan ON/OFF at normal velocity. The green light indicates that the fan is running at normal velocity, and that conditions are safe.
2 Button with blue LED to select the fan ON/OFF at reduced velocity.
3. Button with red light to silence the acoustic alarm. The alarm cannot be muted while cabinet is in operation mode.
4. Button with blue light for normal light ON/OFF.
   Note: For increased safety reduced velocity will turn the light OFF. When the light is switched ON at reduced velocity the fan will automatically go to full velocity.
5. Button with yellow LED light to select UV light ON/OFF. The yellow light indicates that the UV light is ON. (UV light and matching UV timer for radiation time are optional).
   Note: For increased safety against unintended UV radiation which will harm eyes and skin: the front window must be closed in the lowest position and normal light must be switched off before UV light can be switched on.
6. Button to with blue LED OPEN/CLOSE the solenoid gas valve (optional) or other instruments.
7. Button for opening of the front window.
0. Button for closing of the front window.

## 9.1 Programming

The display will show the time and day, and any alarm situations.
On the right hand side of the control panel you will find the navigation controls.
The blue button in the centre is the ENTER button.
The first time the cabinet is connected to the power supply, the display will indicate “Power error”
Press “enter” to accept.
It is now possible to scroll through the different menus using the keys 8/9. If you want to change the setting you choose the respective menu by pressing “enter” and adjust the setting by using the keys 7/0 for in/decrease the setting. By pressing the “enter” key you accept the changed values.

If you want to change the light intensity, press ENTER. – Then go ↑↓ if you want higher or lower level. Press ENTER to accept. – If you don’t press ENTER after 6 sec. it will return to normal display mode.

Change of time and day: - press ENTER, - use ↑↓ to adjust time. Press ENTER to accept.

Change of UV setting: - press ENTER, - use ↑↓ to adjust UV. Press ENTER to accept.

Change of Start up: The cabinet may be turned on automatically every morning. If this is wanted, press ENTER to accept.
**Service mode: This menu is only operated by authorised service people from ScanLaf A/S, distributors and trained technical people of safety reasons.**

## 9.2 Supervision – Alarm

The cabinet safety is constantly supervised so that any deviation from safe conditions or any fault in the supervision system will be indicated immediately.
Safe conditions are indicated by a green LED light in the button for fan at normal velocity.
Unsafe conditions will be indicated both acoustically and visually by red flashing LED light.
The alarm will be initiated if

- The vertical air velocity inside the work chamber is outside the limits stipulated in the relevant standards.
- The horizontal in-going air velocity in the work opening is below the limits stipulated in the standards.
- The front window is not in correct work position, i.e. opening exceeding 200 mm.
- The fan is running at reduced velocity.

The acoustic signal can not be silenced. By activating the alarm the cabinet runs at reduced speed the red LED will change from flashing to constant light.
The alarm will be turned off when fan is running at normal velocity, all conditions are safe, or the cabinet is switched off.

## 10 Cleaning and decontamination

Cleaning must be done daily after work in order to obtain a safe working environment.
The cabinet should be kept clean and free from unnecessary equipment.
The interior should be swabbed with a suitable disinfectant with the right biological spectrum after use. Phenolics, quaternary ammonium compounds and aldehydes can be used for disinfecting these surfaces. Recommended disinfectants are 2% (vol.) gluteraldehyde or 15% (vol.) formaldehyde. Use alcohols on caution because of the risk of fire.
DO NOT USE ANY COMPOUNDS CONTAINING HYPOCHLORITE SOLUTIONS, as this will damage the stainless steel.
Heavy duty polyvinyl chloride (PVC) or rubber gloves which provide suitable protection for the hands and wrists and which can be disinfected for re-use should be worn when cleaning the cabinet.

**Procedure:**

1. Leave the cabinet running at normal speed. Turn on the light.
2. Remove objects and appliances from the work chamber.
3. Lift up the table tops one by one and clean them carefully on both sides. Remove them from the working chamber.
4. Remove all loose objects from the trough, flock filter or the prefilter on Mars Pro.
5. Swab the trough carefully on surfaces, along edges and in corners.
6. Clean the back wall and the side windows.
7. Raise the sliding front window to the highest position using the control panel and open the hinged front cover.
8. Clean the window on the inner side.
9. Close the front cover.
10. Put the clean tabletops back in their place.
11. Let the fan run for 10 minutes.

## 10.1 Weekly

Wipe the outside of the unit with a mild household cleaner. Anti-static spray may be used to clean the front window.

## 10.2 Regularly

Reliable function of the cabinet and compliance with standards are based on the following conditions:

1. Correct air velocities.
2. Efficiency of the HEPA filters installed.
3. Correctly adjusted alarm limits.
4. Tightness of the construction.

## 10.3 Decontamination by use of formaldehyde

The purpose of this section is to state guidelines regarding decontamination by using formaldehyde.

Certification is required in certain countries for decontamination by using formaldehyde.

**Procedure for decontamination by use of formaldehyde**

1. Dismantle the exhaust system, and close the exhaust opening tight with a sealed plate
2. Disconnect the exhaust fan from by removing the fuses (fan 3).
3. Prepare the formaldehyde- and the neutralization solution and place in the evaporator and place it inside the Mars-Mars pro. (The evaporator has a timer function).
4. Bring the sliding window to the lowest position and open the front cover.
5. Seal the window by means of adhesive tape.

**Procedure for decontamination in the Mars-Mars Pro**

1 Let the Mars-Mars Pro run with reduced speed during evaporation of the formaldehyde. This distributes the formaldehyde in the Mars-Mars Pro.

2 Let the influence with formaldehyde last for 6 hours, and let the neutralization last for ca. 1 hour.

3 Switch off the fan.

4 Dismantle the metal plate on the exhaust opening, and mount the exhaust connection.

5 Connect the exhaust fan, reinstalling the fuses.

6 Remove the tape on the front window.

7 Close the front cover and set the sliding window in working position.

8 Let the Mars-Mars Pro run for at least 30 minutes.

9 The Mars-Mars Pro is ready for use.

Decontamination and possible neutralization agents (The formaldehyde is diluted with water):

Model ScanLaf Mars - Mars Pro: Formaldehyde 37%: 40 ml; Water: 40 ml: Ammonia 25%: 27 ml

ScanLaf refers to our Formaldehyde Vaporizer catalogue number: 9.001.020.117.

**Decontamination procedure**

| | |
|---|---|
| Formaldehyde evaporation | 30 minutes |
| Effect time | 5h. 30 minutes |
| Neutralization | 30 minutes |
| Effect time | 30 minutes |
| Airing | 30 minutes |

# 11 Maintenance

Every 5000 operating hours or at least once every year the cabinet has to be inspected and tested.

Before repair work is carried out inside the contaminated and/or infected cabinet and prior to filter replacement and upon change of location, proper cleaning and disinfecting by the operator is required. The lab Manager/Safety Manager must confirm this in writing to service personnel. For the appropriate form, refer to section 13.

After completion of work, tests are required according to the standard.

- Leakage test of pre, main and exhaust air filter.
- Test and adjust air velocities and alarm settings in the vertical flow inside the work chamber and the horizontal in-flow in the work opening.
- Test of air flow patterns.
- General function and safety tests in accordance with local requirements.
  For this purpose we recommend a maintenance agreement.

Before work on the electrical system, disconnect the power.
Fuses are accessible and situated on top of the cabinet (authorized person only).
All maintenance and repair work performed, as well as filter replacements and required tests, must be documented in a test book. See section 12.

## 11.1 Filters

The HEPA filter is very fragile. Even a light touch on the filter surface may damage the filter.

In order to avoid any possible harm, it is recommended that while changing filters the service technician wears a mask with filter of HEPA quality. (H 14 or better).

The used filters must be placed in special bags for biohazard waste immediately after removal. The special bags should be handled as toxic material and sent for destruction as the normal toxic waste from the lab.

## REPLACEMENT OF THE HEPA FILTERS

When the main- or the exhaust HEPA filters need to be replaced on Mars-Mars Pro, due to leakage or to higher pressure drop, it is recommended that both filters are replaced at the same time.
When the prefilter needs to be exchanged on Mars Pro, the main and exhaust filters does not need to be replaced.

**WARNING**

It is important that the service technician is equipped with personal protection gear like lab-coat, gloves and mask, and that the cabinet is documented decontaminated.

To replace the HEPA filters proceed in the following manner:

- Open the service panel of the cabinet, set the window in the highest position and open the service panel.
- Remove the front panel and place it in a safe area.
- The internal filter/fan compartment is now accessible. Now unhook the anchors of the main filter by following the steps: loosen the lock nut, unscrew the two handle bolts (placed on the right-hand and the left of the cabinet below the plastic stoppers) and remove the squads.
- Now lift up the frame and the pressure plenum and carefully remove the main filter, place the filter in a plastic bag and treat it as biohazard waste.
- Now release the anchors of the exhaust filter by following the steps listed below:
- Remove the rectangular steel frame placed on the cabinet's ceiling. Now the exhaust filter is accessible; lift it up and place it in a plastic bag for biohazard waste. Insert the new filter by performing the reverse operations for its installation.

Filters must be provided with gasket on both sides.
Before installing the new filters, the filter frame must be cleaned very carefully.
The new filters must correspond to make and the model indicated on the tags placed on the removed panel (also see paragraph 11.2 LIST OF SPARE PARTS).

**A ROUTINE TEST IS COMPULSORY AFTER THE REPLACEMENT OF THE FILTERS (see dedicated paragraph).**

The prefilters on Mars Pro are easily exchanged while the cabinets are running under full speed to ensure full operator and environment protection. The prefilter cassettes are taken up and the prefilter are carefully placed in plastic back and closed safely. Before installing the new filters, the filter frame must be cleaned very carefully. Be carefull not to harm the prefilters.
The new filters must correspond to make and the model indicated on the tags placed on the removed panel

## 11.2 Part list for Filter

The cabinet has been tested and approved with main and exhaust filters from Camfil.
Pre filter (Mars Pro): Camfill Megalam MD-G10-VH14
Main filter: Camfil Megalam MG14-G10-1220×054×110-01PUH14
Exhaust filter: Camfil Megalam MD5014-33-G10-610×054×069-01PUH14

## 11.3 Fuses

The fuses of Mars GS are located in the right side of the top of the cabinet behind a protective cover.

| Component | Fuse | Phase/zero |
|---|---|---|
| Main | T10A | Ø5x20 |
| Main | T10A | Ø5x20 |
| Electrical outlet | T6.3A | Ø5x20 |
| Electrical outlet | T6.3A | Ø5x20 |
| Option 1 | T1A | Ø5x20 |
| Option 2 | T1A | Ø5x20 |
| Option 3 | T1A | Ø5x20 |
| Light | T1A | Ø5x20 |
| UV-light | T1A | Ø5x20 |
| Fan | T5A | Ø5x20 |

**Equipment required**

Small screwdriver for slotted screws and

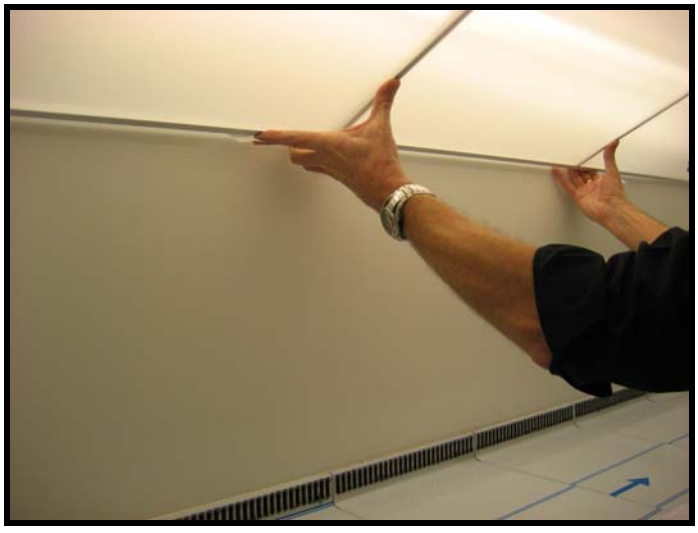
Fuses (see the Instruction Manual).

**Procedure for replacement of fuses (Authorized persons, only)**

- Switch off the power
- Remove the protective cover
- Locate the burned fuse
- Replace the fuse
- Install the protective cover
- Switch on the power

## 11.4 UV GERMICIDAL LAMP – Fluorescent lamp

To open the service panel of the cabinet, set the window in highest position and you can open the service panel.



The fluorescent and UV lamp (germicidal) have an average life time of about 5000 hours. SCANLAF, however, suggests its replacement after no more than 2000÷3000 hours. The luminous potential delivered drops to 70% after said period.

**REPLACEMENT OF THE FLUORESCENT LIGHT TUBES**

Remove the air distributor located in top of the work chamber (handle with care)
Release the two lamps from the fixtures by rotating them 90º.
Install the new lamps performing the inverse operation.

**REPLACEMENT OF THE UV lamp TUBES**

The UV light is located on the backwall
Release lamps from the fixtures by rotating it 90º.
Install the new UV -lamp performing the inverse operation.

NOTE: Use gloves when manipulating a germicidal UV lamp, to prevent leaving hand prints that reduce the effects of the ultraviolet radiation.
Replace UV lamp every 2000 or 3000 hours of life.

## 11.5 Electrical spare parts.

| Mars –Mars PRO | Cat. No. |
|---|---|
| Fluorescent lamp 30 W/83 | 844027 |
| UV light tube type TUV 15-30W | 844030 |
| G-fuse 5x20 mm T 10A, 250 Volts | 841274 |
| G-fuse 5x20 mm T 6.3A, 250 Volts | 88851096 |
| G-fuse 5x20 mm T 1A, 250 Volts | 88851097 |

## 11.6 Spare parts

| Model | Item | Cat. No. |
|---|---|---|
| Mars 1200 | Main HEPA filter | 9.000.050.002 |
| Mars 1500 | Main HEPA filter | 9.000.050.003 |
| Mars 900 | Light tube | 9.000.040.011 |
| Mars 1200 | Light tube | 9.000.040.012 |
| Mars 1200 | UV-light tube | 9.000.040.002 |
| Mars 1500 | UV-light tube | 9.000.040.003 |
| Mars 900, 1200 | Exhaust HEPA filter | 9.000.060.001 |
| Mars 1500, 1800 | Exhaust HEPA filter | 9.000.060.002 |
| Mars all | Circuit Board | 9.001.900.011 |
| Mars Pro | V-shaped prefilter | 9.000.050.013 |

# 12 Log-Book

| Type : | Product name : | Serial no. : | Supplier : |
|---|---|---|---|

Service interval : _____ Laboratory : _____

| Service / repair | Fault occurred on | Notified / date | Repaired / date | Remark / fault | Caused by / action | Service internal/external | Carried out by |
|---|---|---|---|---|---|---|---|
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# 13 Statement

**Statement regarding personal safety for repair/inspection**

ScanLaf is legally obliged to protect its employees from all dangers.
We therefore kindly ask you to complete this statement before work is commenced.

Subject: Service report No. _____ Service agreement No. _____

The undersigned hereby declares that the above repair/inspection will not expose the service technician to hazardous biological, chemical or radioactive agents. Reservations, if any, may be indicated here (e.g., use of gloves, respiratory gear, etc.).

| | | |
|---|---|---|
| | | |
| Date | Name in block letters | Signature |

# SCANLAF A/S

## ***Declaration of Conformity***

**We declare under our responsibility, that the following product**

**Model: Mars-Mars PRO GS, model 900, 1200, 1500, 1800**

**to which this declaration relates is in conformity with the following standard(s) directives or other normative document(s):**

**DS/EN ISO 12100-1: 2003 Safety of machinery**
**(basic concepts – General principles)**

**DS/EN ISO 12100-2: 2003 Safety of machinery**
**(Technical principles and specifications)**

**EN 60204-1: 2006 Safety of machinery**
**(Electrical equipment of machines – General requirements)**

**DS/EN 61010-1: 2001 Safety requirements for electrical equipment for measurement, control and laboratory use**
**(General requirements)**

**DS/EN 61000-6-3: 2002, DS/EN 61000-6-1: 2002**
**Electromagnetic compatibility**
**(Generic immunity/emission standard)**

**EN 1050: 1997 Safety of machinery**
**(Principles for risk assessment)**

**following the provisions of:**

**Directive 98/37/EEC Machinery**
**Directive 73/23/EEC Low voltage**
**Directive 89/336/EEC Electromagnetic compatibility**

**Lynge, July, 2007**

**Finn Kokholm ScanLaf A/S, Nøglegårdsvej 20, Vassingerød, 3540 Lynge, Denmark**
**Managing Director**

Fisher Scientific
Part of Thermo Fisher Scientific

| | | | | | |
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